IN THE SPECIFICATION:

Please replace the paragraph on page 1, line 17 to 20 with the following:

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5   U.S. Pat. Application Ser. No. ⸺⸺⸺,09/724,309, now U.S. Patent No.

6,671,654, "APPARATUS AND METHOD FOR MEASURING AND REPORTING THE

RELIABILITY OF A POWER DISTRIBUTION SYSTEM", ~~(Attorney Ref. No. 6270/49)~~,

filed concurrently herewith.

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Please replace the paragraph on page 15, line 6 to 28 with the following:

Figure 1 illustrates an overview of the preferred embodiment of the Power

Management Architecture ("architecture") 100, which contains one or more IED's 102, 103,

15   104, 105, 106, 107, 108, 109. The IED's 102-109 are connected to an electrical power

distribution system 101, or portion thereof, to measure, monitor and control quality,

distribution and consumption of electric power from the system 101, or portion thereof. The

power distribution system is typically owned by either a utility/supplier or consumer of

electric power however some components may be owned and/or leased from third parties.

20   The IED's 102-109 are further interconnected with each other and back end servers 120, 121,

122, 123, 124 via a network 110 to implement a Power Management Application

("application") 111 (not shown). In the preferred embodiment, the network 110 is the

Internet. Alternatively, the network 110 can be a private or public intranet, an extranet or

combinations thereof, or any network utilizing the Transport Control Protocol/Internet

25   Protocol ("TCP/IP") network protocol suite to enable communications, including IP

tunneling protocols such as those which allow virtual private networks coupling multiple

intranets or extranets together via the Internet. The network 110 may also include portions or

sub-networks which use wireless technology to enable communications, such as RF, cellular

or Bluetooth technologies. The network 110 preferably supports application protocols such

30   as telnet, FTP, POP3, SMTP, NNTP, Mime, HTTP, SMTP, SNNP, IMAP, proprietary

protocols or other network application protocols as are known in the art as well as transport

protocols SLIP, PPP, TCP/IP and other transport protocols known in the art.

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5   Please replace the paragraph on page 16, line 29 to page 16, line 5 with the following:

The Power Management Application 111 utilizes the architecture 100 and comprises

power management application components which implement the particular power

management functions required by the application 111. The power management application

10   components are located on the IED 102-109 or on the back end server ~~121~~ 120-124, or

combinations thereof, and can be a client component, a server component or a peer

component. Application components communicate with one another over the architecture

100 to implement the power management application 111.

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Please replace the paragraph on page 16, line 6 to line 18 with the following:

In one preferred embodiment the architecture 100 comprises IED's 102-109 connected

via a network 110 and back end servers 120, 121, 122, 123, 124 which further comprise

20   software which utilizes protocol stacks to communicate. IED's 102-109 can be owned and

operated by utilities/suppliers 130, 131, consumers 132 133 or third parties 134 or

combinations thereof. Back end servers ~~120 121 122 123 124~~ 120, 121, 122, 123, 124 can be

owned by utilities/suppliers 130, 131, consumers 132, 133, third parties 134 or combinations

thereof. For example, an IED 102-109 is operable to communicate directly over the network

25   with the consumer back-end server 120, 121, another IED 102-19 or a utility back end server

123,124. In another example, a utility back end server 123, 124 is operable to connect and

communicate directly with customer back end servers 120, 121. Further explanation and

examples on the types of data and communication between IED's 102-109 are given in more

detail below.

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Please replace the paragraph on page 16, line 19 to page 17, line 4 with the following:

Furthermore, the architecture's 100 devices, such as the back end servers 120-124 or IED's 102-109, can contain an email server and associated communications hardware and software such as encryption and decryption software. Other transfer protocols, such as file transfer protocols (FTP), Simple Object Access Protocol (SOAP), HTTP, XML or other protocols know in the art may also be used in place of electronic mail. Hypertext Transfer Protocol (HTTP) is an application protocol that allows transfer of files to devices connected to the network. FTP is a standard internet protocol that allows exchange of files between devices connected on a network. Extensible markup language (XML) is a file format similar to HTML that allows transfer of data on networks. XML is a flexible, self describing, vendor-neutral way to create common information formats and share both the format and the data over the connection. In the preferred embodiment the data collection server is operable by either the supplier/utility 123, 124 130, 131 or the customer 132, 133 of the electrical power distribution system 101. SOAP allows a program running one kind of operating system to communicate with the same kind, or another kind of operating system, by using HTTP and XML as mechanisms for the information exchange.

Please replace the paragraph on page 17, line 31 to page 18, line 29 with the following:

Figure 2a illustrates a preferred embodiment where and IED 200 contains several power management components 201 202 203 201, 202, 203 and power management circuitry 220. The power management circuitry 220 is operable to implement the IED's functionality, such as metering/measuring power delivered to the load 218 from the electrical power distribution system 216, measuring and monitoring power quality, implementing a protection relay function, or other functionality of the IED 200. The IED 200 further includes a power management application components 211 coupled with the circuitry 220 and a protocol stack 212 and data communication interface 213. The protocol stack 212 and data communications interface 213 allow the IED 200 to communicate over the network 215. It

will be appreciated that, as described below, the protocol stack 212 may include an interface layer which comprises the data communications interface 213. The power management application components 211 include software and/or hardware components which, alone, or in combination with other components, implement the power management application 111.

5   The components 211 may include components which analyze and log the metered/measured data, power quality data or control operation of the IED 200, such as controlling a relay circuit. The components 211 further include software and/or hardware which processes and communicates data from the IED 200 to other remote devices over the network 215, such as back end servers 121-124 or other IED's 200 (102-109), as will be described below. For

10   example, the IED 200 is connected to a load 218. The power management circuitry 220 includes data logging software applications, memory and a CPU, which are configured to store kWh data from the load 218 in a memory contained within the power management circuitry. The stored data is then read and processed by the components ~~201-202~~ 201, 202 in the power management application 211. The components communicate with operating

15   system components which contain the protocol stack 212 and the processed data is passed over the network 215 to the appropriate party via the data communications interface 213. One or more of the components 211 may communicate with one or more application components located on one or other IED's 200 and/or one or more back end servers 121-124.

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Please replace the paragraph on page 19, line 21 to page 20, line 31 with the following:

In one embodiment the application components comprise software components, such

25   as an email server or an XML or HTTP server. These servers may include a Microsoft Exchange server or a BizTalk framework/XML compatible server. A Microsoft Exchange™ server is an email server computer program manufactured by Microsoft Corporation, located in Redmond, Washington, typically operating on a server computer which facilitates the reception and transmission of emails, and forwards emails to the email client programs, such

30   as Microsoft Outlook™, of users that have accounts on the server. BizTalk is a computer industry initiative which promotes XML as the common data exchange for e-commerce and

application integration over the internet. BizTalk provides frameworks and guidelines for how to publish standard data structures in XML and how to use XML messages to integrate software components or programs. Alternately, hardware components, such as a dedicated cellular phone, GPS encryption or decryption key or dongle are included in the components.

5   In a further embodiment, a combination of both hardware and software components are utilized. Additionally, referring back to Figure 1, one or more power management application components 290 can utilize the architecture 100 to implement their functionality. For example, a utility 130 has a back end server 124 which contains power management application and associated components, such as a usage and consumption monitoring

10   component 258. The utility 130 supplies power to a consumer 132 via the power distribution network 110 101 and monitors the consumers power consumption using the power management application components on the back end server 124 which communicates with the IED's 104, 105, 108 via the network 110 to retrieve measured consumption/usage data. The consumer 132 concurrently monitors usage of loads 150, 151, 153, using an IED 104,

15   105, 108 which is connected to the network 110, computing real time costs posted by the utility 130. In one embodiment, the consumer 132 monitors usage using back end server 120 which receives usage and consumption data from the IED's 104, 105, 108 via the network 110. The IED 104, 105, 108 implements power management application components such as load management components and billing management components. The back end server

20   120, 124 implements power management application components such as a data collection component, a billing/revenue management component, an automated meter reading component or a usage/consumption management component. The components on the IED 104, 105, 108 work in concert with the components on the back end server 120, 124 via the network 110 to implement the overall power management application. In a further

25   embodiment, one or more power management application components are operating on IED 104, 105, 108 and/or back end servers 120, 124 at any given time. Each power management application can be utilized by one or more users, or different applications can be used by different users. Moreover, the application components can exist on the same or different IED's 104, 105, 108 or back end servers 120, 124.

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Please replace the paragraph on page 21, line 1 to 29 with the following:

In the preferred embodiment, the data collection component 250 enables an IED to collect and collate data from either a single or multiple sources via the network 110. The data collected by the component is stored and can be retrieved by other components of the power management application components 290, or other components implemented on other IED's 102-109 located on the network 110. In the preferred embodiment the Automated Meter Reading component 253 is utilized to allow either the consumers 132, 133 or providers 130, 131 to generate power management reports from the IED data. In the preferred embodiment the electrical power generation management component 260 analyzes data received from IED's 102-109 to either minimize or maximize measured or computed values such as revenue, cost, consumption or usage by use of handling and manipulating power systems and load routing. IED inventory, maintenance and fraud detection component 261, 262, 263 receive or request communications from the IED's 102-109 allowing the power management application to inventory the installed base of IED's 102-109, including establishing or confirming their geographic installation location, or check the maintenance history of all connected IED's ~~102-109~~ 102-109. These power management applications aid in confirming outage locations or authenticating communications to or from an IED 102-109 to prevent fraud and minimize errors. In one embodiment, the IED inventory component 261 utilizes cellular triangulation technologies, or caller ID based geographic locator technologies to determine and verify IED inventories. In the preferred embodiment the fraud detection component 263 further detects device tampering. In the preferred embodiment the power quality monitoring component 264 monitors and processes electric parameters, such as current, voltage and energy which include volts, amps, Watts, phase relationships between waveforms, kWh, kvAr, power factor, and frequency, etc. The power quality monitoring component 264 reports alarms, alerts, warnings and general power quality status, based on the monitored parameters, directly to the appropriate user, such as customers 132, 133 or utilities 130, 131.

Please replace the paragraph on page 22, line 19 to page 23, line 2 with the following:

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Figure 3b illustrates a more detailed embodiment of the IED's 310 power management application components 311 and protocol stacks. The IED 310 includes power management application components 311, a communications protocol stack 312 and a data

5   communications interface 313 (as was noted above, in alternate embodiments, the protocol stack 312 may include the data communications interface 313). The application components 311 includes a Load management component 315a, which measures the load's ~~301~~ 317 consumption of electrical power from the portion of the power distribution system 316, a Power Quality component 315b, which measures power quality characteristics of the power

10   on the portion of the power distribution system 316, and a billing/revenue management component 315c, which computes the quantity and associated value of the incoming power. The power management components are connected to the network via the data communications interface 312 using the communications protocol stack 312 (described in more detail below).

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Please replace the paragraph on page 23, line 21 to page 25, line 21 with the following:

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20   Figure 3c illustrates a preferred embodiment of the communications protocol stack 305e. In the preferred embodiment the connection between devices coupled with the network 110 is established via the Transmission Control Protocol/Internet Protocol ("TCP/IP") protocol suite. To facilitate communications over a network or other communications medium, devices typically include a set of software components known as a

25   protocol stack. The protocol stack handles all of the details related to communicating over a given network so that other application programs executing on the device need not be aware of these details. The protocol stack effectively interfaces one or more application programs executing on the device to the network to which the device is connected. Typically, the protocol stack is arranged as a layered architecture with one or more software components in

30   each layer. In the preferred embodiment, the protocol stack includes an application layer 321, a transport layer 322, a routing layer 323, a switching layer 324 and an interface layer

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325. The application layer 321 includes all of the applications component software and/or

power management component software. The application layer 321 is coupled with the

transport layer 322. Applications or software components in the application layer

communicate with the transport layer in order to communicate over the network. In the

5   preferred embodiment, the transport layer is implemented as the Transmission Control

Protocol ("TCP"). The transport layer, using TCP, divides communications from the

applications of the application layer 321 into one or more packets for transmission across the

network. The transport layer adds information about the packet sequence to each packet plus

source and destination information about what application component generated the

10   communication and to what application component on the receiving end the communication

should be delivered to once reassembled from the constituent packets. The routing layer is

coupled with the transport layer and is responsible for routing each packet over the network

to its intended destination. In the preferred embodiment, the routing layer is implemented as

the Internet Protocol ("IP") and utilizes internet protocol addresses to properly route each

15   packet of a given communication. The switching and interface layers 324, 325 complete the

protocol stack and facilitate use of the physical hardware which couples the device to the

network. This hardware may include an Ethernet interface, a modem, or other form of

physical network connecting including RF based connections such as Bluetooth interfaces.

Generally, the preferred embodiments are capable of communicating via any network which

20   transmits information utilizing the TCP and IP, collectively TCP/IP, protocols as are known

in the art. TCP/IP is essentially the basic communication language of the both the Internet

and private intranets. TCP/IP utilizes the communications protocol stack and can be

described as comprising a TCP layer which manages the decomposing and reassembling of

messages from the application layer 321 into smaller more manageable packets, and the IP

25   layer which handles the addressing of the packets. The IP layer comprises the routing layer

323, the switching layer 324 and the interface layer 325. The interface layer 325, as

described above, makes the physical connection with the network utilizing connections such

as Ethernet, dial-up-modems, Point-to-Point Protocol (PPP), Serial Line Interface Protocol

(SLIP), cellular modems, T1, Integrated Service Digital Network (IDSN), Digital Subscriber

30   Line (DSL), Bluetooth, RF, fiber-optics or AC power line communications. In an alternate

embodiment multiple interface layers 325 are present. For example, the interface layer 325

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contains both an Ethernet and cellular modem thus enabling the IED to connect to the network with either interface. This redundancy is advantageous if one interface is inoperable due to a local Ethernet or cellular network outage. It is preferable that one or more of the application components in the application layer 321 implement TCP compatible protocols for

5   the exchange of their communications over the network. Such TCP compatible protocols include the Instant Messaging protocol, file transfer protocol ("FTP"), or Hypertext Transport Protocol ("HTTP"). In addition, a Secure HTTP (S-HTTP) or Secure Socket Layers (SSL) may also be utilized between the application layer 321 and the transport layer 322 for secure transport of data when HTTP is utilized. S-HTTP is an extension to HTTP

10   that allows the exchange of files with encryption and or digital certificates. SSL only allows authentication from the server where S-HTTP allows the client to send a certificate to authenticate to the user. T he routing The routing layer 323 and the switching layer 324 enable the data packet to arrive at the address intended.

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Please replace the paragraph on page 26, line 30 to page 27, line 17 with the following:

In an alternate embodiment the Security Sub-layer 321a may include multiple

20   encryption keys, each conferring different access rights to the device. This enables multiple users, such as a utility and customers, or multiple internal departments of a utility or customer, to send or receive data and commands to or from the IED. For example a customer's IED sends out two encrypted messages, one billing data and one power quality data, to the customer's office site. The billing data message is encrypted at a level where

25   only the internal accounting department has access to decrypt it. The power quality data message is encrypted at a different level where the entire company can decrypt the message. Furthermore, in the preferred embodiment, commands sent to or from the IED are coupled with the appropriate encryption key. For example, the IED's Security Sub-layer 321a may only permit billing reset commands to be received and processed if the command has been

30   authenticated where the point of origin was the appropriate customer or utility. Further, encrypted email messages may also include various encrypted portions, each accessible and

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readable with a different encryption key. For example an IED sends out one message to both the utility and the customer containing billing data and power quality data. ~~T he data~~ The data is encrypted with two different encryption keys so only the utility can decrypt the power quality data and only the customer can decrypt the billing data.

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Please replace the paragraph on page 27, line 18 to line 30 with the following:

In operation the IED monitors the power distribution system ~~301~~ 300 for billing
10 events such as, kWh or kvA pulses. In one embodiment the IED may store billing events and transport the data to the power management application components operating on a back end server either upon request or upon pre-determined time intervals. Alternately the IED may transport billing event data in real time to the back end server. Data may be filtered through the either the Back End Server's or IED's power management components or any
15 combination or variation thereof, before being entered into the Billing/Revenue Management component where billing, revenue, cost and usage tracking are computed into revised data. The Billing/Revenue Management components either stores the computations for future retrieval or pushes the revised data to the appropriate party, such as the consumer or provider of the electric power system. Data can be retrieved upon command or sent or requested upon
20 a scheduled time.

Please replace the paragraph on page 28, line 20 to page 29, line 9 with the following:

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25 The power management functions implemented by the IED's enables the back end servers or IED's to control power flow and distribution over the electrical power distribution system. Specifically the power management application components process power measurement data and generate power measurement and reporting commands, transmitting them to the back end servers or IED's for execution. Referring now to Figure 4b, in one
30 preferred operation a load is monitored by a IED where kvA and kWh pulse data are sent in real time over the network 424 to the Application via email or another transport protocol. If

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pre-processing is required 425a the raw pulse data is transported into a data collection server or component where it is translated into a format readable by the billing/revenue management component 426. Alternately, the billing/revenue management component may be configured to receive and process data without pre-processing 425b. Once sent to the

5   billing/revenue management component 428 the data is compared and analyzed for usage, consumption or billing revenue ranges against a pre-determined tariff structure ~~432~~ (430, 432 in figure 4b) where any anomalies, excess or shortages are reported back to the IED in the form of a command to a power management function which controls the power flow and load distribution accordingly 434. The components further contact the required parties, such

10   as the consumer or provider of the load, over the network, forwarding power quality, billing, usage or consumption reports or any power management functions that were required against the set tariff structure (436 in figure 4b).

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15   Please replace the paragraph on page 29, line 10 to line 28 with the following:

Figure 5a illustrates a preferred embodiment for a usage and consumption management application of the power management architecture. The IED 502 implements a power management function of controlling the source of electrical power for the load 501

20   from either energy supplier 1 505 or energy supplier 2 506. The application is designed to take advantage a deregulated marketplace and operate the load 501 from the most cost efficient energy supplier at the given time period. Which supplier is most efficient may fluctuate frequently as a function of the energy market and supply and demand for electrical power. Referring to Figure 5b, the IED 502 contains a usage and consumption management

25   component which receives tariff and cost structures from multiple energy suppliers 505, 506. The component receives usage and consumption from the Load 501 and compares actual usage against multiple tariff structures choosing the most cost effective provider for a given load. Similarly the load management component 259 , as shown in Figure 2b, is utilized to connect and disconnect loads to and from the electrical distribution system during either low

30   and high rate and demand periods, hence reducing the electrical power costs and demand. In the preferred embodiment the load management component ~~250~~ 259 is programmed to run in

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C14 an automated fashion based on feedback from the system, however in an alternate embodiment the component is operated manually based on user input.

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5   Please replace the paragraph on page 29, line 29 page 30, line 10 with the following:

For example, an IED 502 is connected to a power line 500 and associated load 501. The IED 502 measures power usage by the load (511, 512 Figure 5b) and transmits this consumption data 514 over a network 510 to a usage and consumption management

10   application component operating on a back end server 511. The Usage and consumption

C15   management component receives and tracks cost and usage 516, 518 and compares rates for actual usage against multiple suppliers bids 522. Suppliers have the option to either push tariff structures to the application component or have tariff structures polled over the network. Once the most cost effective structure is determined by the usage and consumption

15   management component, a command or function is sent to the IED 502 with the new tariff structure 523, 524. Alternately, the new tariff structure is applied across to the billing/revenue management component where billing is applied to the usage and revenue reports are forwarded onto the appropriate parties.

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Please replace the paragraph on page 31, line 3 to page 32, line 5 with the following:

The distributed power management component 254 allows for the distribution of work or data processing to various devices on the network. In operation, an IED measures or

25   detects an occurring or impending catastrophic power quality event and alerts other

C16   downstream IED's (on the power distribution network) of the event thereby giving the downstream IED's an opportunity to disconnect or alter loads before the event reaches the downstream system and causes damage. The component further includes a function that, upon detection of an occurring or impending event, alerts downstream IED's or back end

30   servers to alert their connected loads to either protect themselves from the outage by shutting down, or instructing them to shut down applications that may cause critical failure or damage

if interrupted, such as writing to a hard-drive. Figure 6 illustrates a preferred embodiment of the distributed power management component in action. An Electrical power distribution system 600 distributes energy over distribution lines 601 which are connected to multiple IED's 620, 622, 624, 626 which are present to continuously monitor the energy being fed

5 onto their respective loads 621 623 and generators 625 627 on a given branch and furthermore all IED's 620, 622, 624, 626 are connected via a network 610 as described above. IED's ~~616 618~~ 616, 618 are also present on the distribution system 600 to continuously monitor energy being transferred onto the system as a whole. It will be appreciated that the loads and generators may reside on multiple or separate consumer sites.

10 In operation, a catastrophic power quality event is detected on a load 623 by the attached IED 622. The IED 622 takes appropriate action, such as triggering a protection relay, on the load and further transmits communications of its actions to upstream IED's ~~616 618~~ 616, 618. This ensures local containment of the event by the IED 622 informing upstream IED's to not duplicate the action on the larger system. Obviously retaining upstream IED's as a

15 backup is not discounted in this operation. Alternatively, the operation is utilized to coordinate downstream IED's over the network 610. For example an event may be detected at the distribution system 600 by an IED 616 monitoring the system 600 which triggers, for example, a protection relay. The IED 616 which triggered the protection relay communicates its actions to downstream IED's ~~618 620 622 624 626~~ 618, 620, 622, 624, 626

20 over the network 610 allowing them to take appropriate intelligent action, such as disconnection the generators ~~625 627~~ 625, 627. It can be appreciated that IED applications may include a combination of the centralized and distributed power management components.

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Please replace paragraph on page 32, line 6 to line 17 with the following:

In one embodiment, a power reliability component 256 is provided in the IED to measure and compute the reliability of the power system. Power system reliability is

30 discussed in commonly assigned U.S. Pat. Application Ser. No. ——— ~~,~~09/724,309, now U.S. Patent No. 6,671,654, "APPARATUS AND METHOD FOR MEASURING AND

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REPORTING THE RELIABILITY OF A POWER DISTRIBUTION SYSTEM", captioned above. In the preferred embodiment the component 256 computes and measures reliability as a number of "nines" measure. The component includes a function which compiles the reliability of the power from other components located on back end servers or IED's, giving a

5 total reliability. This function also enables a user to determine which part of the distribution system has the most unreliable power. Knowing this enables the user to focus on the unreliable area, hopefully improving local power reliability and thus increasing overall reliability.

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Please replace the paragraph on page 32, line 18 to 27 with the following:

For example, referring now to Figure 7, an IED 711 is connected to a network 710 and measures the reliability of the power distribution system 701 which supplies power to

15 loads ~~724 726~~ 722, 724 within a customer site 705. The customer also provides a generator 726 which supplies power to the loads ~~722 724~~ 722, 724 at various times. The customer measures the power reliability of the system for the load ~~722 724~~ 722, 724 using the associated IED ~~712 714~~ 712, 714 and considers it unreliable. One IED's 714 power reliability component polls the other IED's ~~711 712 716~~ 711, 712, 716 and determines the

20 unreliable power source is coming from the generator 726. From this the customer can decide to shut off the power supply from the generator 726 in order to improve the power reliability of the system.

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25 Please replace the paragraph on page 33, line 7 to 18 with the following:

Peer to peer communications between IED's and between back end servers are supported by the peer to peer management component 257. In the preferred embodiment peer to peer communications are utilized to transport or compile data from multiple IED's.

30 For example, as shown in Figure 8, an IED 800 is connected to a network 810. Multiple loads ~~806 808~~ 806, 808 draw power from a power utility's 803 power distribution line 801

and each load is monitored by an IED ~~804 806~~ 802, 804. An IED 800 polls load and billing data from all other IED's on the network on the customer site ~~802 804~~ 802, 804. Upon request, the IED 800 then transmits the load and billing data to the customer's billing server 814. In the preferred embodiment, the IED 800 communicates the load and billing data in a

5   format which allows software programs inside the customer billing server 814 to receive the data directly without translation or reformatting.

Please replace paragraph on page 36, line 20 to page 37, line 10 with the following:

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Referring to Figure 11, there is shown an exemplary screen display of a Microsoft Excel worksheet which is coupled with the IED 1002 as described above. In this example, the IED 1002 is a model 8500 meter, manufactured by Power Measurement Limited, in Victoria, British Columbia, Canada. The IED 1002 is coupled via a TCP/IP based network

15   with a personal computer having at least 64 MB memory and 6 GB hard disk with a Pentium™ III or equivalent processor or better, executing the Microsoft Windows 98™ operating system and Microsoft Excel 2000. The computer further includes Microsoft Internet Explorer ™ ~~5..0 which~~ ™ 5.0 which includes an XML parser that receives and parses the XML ~~data fro~~ data from the meter and delivers it to the Excel worksheet. The

20   worksheet displays real time data received directly from the IED 1002 in an XML format. As the IED 1002 detects and measures fluctuations in the delivered electrical power, it transmits updated information, via XML, to the worksheet which, in turn, updates the displayed data in real time. Note that all of the features of the Microsoft Excel program are available to manipulate and analyze the received real time data, including the ability to

25   specify mathematical formulas and complex equations which act on the data. Further, display templates and charting/graphing functions can be implemented to provide meaningful visual analysis of the data as it is received. Further, the real time data can be logged for historical analysis. In one embodiment, the activation of a new IED 1002 on the network is detected by the worksheet which cause automatic generation of a new worksheet to receive

30   and display data from the new device.